NESMEYANOV, AN. N.

AID P - 2450

Subject : USSR/Aeronautics

Card 1/1 Pub. 135 - 16/19

Author : Nesmeyanov, An. N.

Title : Nesmeyanov, An. N. Radioactive elements and their use, 1955. (Book review)

Periodical : Vest. vozd. flota, 8, 84, Ag 1955

Abstract : This book belongs to the popular science library series for the soldier and sailor. It gives some general notions of the modern theory of the structure of matter, radio-activity, and particles, radiation and the use of atomic energy in peace and war. It mentions also the design of a jet engine powered with atomic energy.

Institution: None

Submitted : No date

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R001136630(

Periodical : Dok. AN SSSR 102/2, 307-310, May 11, 1955

Abstract : The application of the isotopic exchange method for the measurement of saturated vapor pressures is discussed. The speed of the measuring process at a given temperature can be determined by the value of the specific activity of one of the samples placed in a closed vacuum vessel and upon rate of evaporation and diffusion, as well as the condensation coefficient. Numerous equations are given which make such determination possible. Two USSR references (1947).

Institution : Moscow State University im. M.V.Lomonsov

Presented by : Acadimician P. A. Rebinder, December 14, 1954

NESMEYANOV, An.N.; SAVICH, I.A.; EL'KIND, M.F.; KORYAZHKIN, V.A.

Determining the solubility of molybdates of alkaline earth metals by means of tagged atoms. Vest.Mosk.un. Ser.mat.,mekh.,astron., fiz.,khim.11 no.1:221-224 '56. (MIRA 10:12)

1. Kafedra neorganicheskoy khimii Moskovskogo universiteta.
(Solubility) (Molybdates) (Radioisotopes)

NESMEYANOV, AN. N.

USSR/Kinetics, Combustion, Explosions, Topochemistry, Catalysis B-9

Abs Jour : Ref Zhur - Khimiya, No 7, 1957, 22405.

Author : AN. N. Nesmeyanov, V. Ya. Kabanov, Yu. P. Trusov, M. M. Privalova.

Inst : Not given

Title : Study of bromine isotope interchange between elements bromides and organic bromoderivatives.

Orig Pub : Zhur. fiz. khimii, 1956, 30, No 3, 566-576.

Abstract : The activation energy of bromine isotope interchange between Na, Rb, Ca, Ba-bromides and n- $C_4H_9B_2$ (I) in abs. acetone is approximately the same and is equal to 18-20 kcal/mole. Water, alkali, and neutral salts additions slow down the interchange between NaBr and I in abs. acetone. The interchange is taking place according to ionic mechanism. No interchange of bromine between Cd, Zn, Sb and I bromides in different solvents and at different temperatures was found. An interchange of bromine between $SbBr_3$ and I and $C_2H_5B_r$ in gaseous phase was taking place. A new method of synthesis active metal bromides synthesis was developed by way of their interchange with an active Na-bromide.

-131-

Card 1/1

SILAYEV, A.B.; NESMEYANOV, An.N.; FEDOSEYEV, V.M.; KONDAKOVA, N.V.

Synthesis of α, β -dimercaptopropionoic acid, containing radioactive sulphur. Zhur.ob.khim. 27 no.10:2871-2873 O '57. (MIRA 11:4)

1. Moskovskiy gosudarstvennyy universitet.
(Propionoic acid) (Tracers (Biology))

PHASE I BOOK EXPLOITATION 843

Nesmeyanov, Andrey Nikolayevich

Radioaktivnyye izotopy i ikh primeneniye (Radioactive Isotopes and Their Use) Moscow, Voyen. izd-vo M-va Obor. SSSR, 1958. 189 p. (Series: Nauchno-populyarnaya biblioteka) No. of copies printed not given.

Ed.: Naumenko, I.A., Candidate of Technical Sciences, Engineer-Lieutenant Colonel, Docent; Ed. of Publishing House: Kader, Ya. M.; Consultant of Publishing House: Neyman, M. B., Doctor of Chemical Sciences, Professor; Tech. Ed.: Anikina, R. F.

PURPOSE: This book is intended for the general reader.

COVERAGE: The author explains in popular form the structure of matter, the effect of radioactivity, and the properties of radioactive isotopes. He also discusses the peaceful use of atomic energy in various fields of science and industry. The last part of the book is devoted to the military use of atomic energy and precautions to be taken in case of an atomic attack. No personalities are mentioned. There are no references.

Card 1/4

Radioactive Isotopes and Their Use 843

TABLE OF CONTENTS:

Card 2/4

Card 3/4

843

Radioactive Isotopes and Their Use

AVAILABLE: Library of Congress

Card 4/4

BK/mas
12-8-58

SOV 156-58-1-15/46

AUTHORS: Zelentsov, V. V., Nesmeyanov, An. N., Savich, I. A.

TITLE: The Isotopic Exchange in Some Intra-Complex Compounds of Hexavalent Molybdenum (Izotopnyy obmen v nekotorykh vnutrikompleksnykh soyedineniyakh shestivalentnogo molibdena)

PERIODICAL: Nauchnyye doklady vysshey shkoly, Khimiya i khimicheskaya tekhnologiya, 1958, Nr 1, pp. 59 - 61 (USSR)

ABSTRACT: The authors proved already earlier that the Schiff bases which develop from the condensation of o-oxy aldehydes with aromatic amines, may form intra-complex compounds with a molybdenyl ion. Some of their properties are given in short. In order to explain the structure of the compounds discussed it was necessary to determine the character of the bond between the central complex forming group

MoO_2^{2+} and the organic radicals. The authors assume that the isotopic exchange is one of the criteria which make possible the further investigation of the said bond. The difference between the MoO_2^{2+}-ion in the complex compound (bottom phase)

Card 1/3

The Isotopic Exchange in Some Intra-Complex Compounds of Hexavalent Molybdenum SOV/156-58-1-15/46

and the same ion which forms a soluble molybdenyl salt in the solution is to be investigated here. A lacking exchange would speak in favor of a covalent character of the bond. If an exchange takes place, the bond has a more or less ionic character. The authors investigated the exchange degree and the exchange velocity of the group MoO_2^{2+} of the dicyclical intra-complex compounds. Absolute ether was chosen as medium, though the exchange velocity was much reduced by it. The production method of the used molybdenum oxychloride is described. The active intra-complex compounds were produced by the action of a corresponding Schiff base on the molybdenum oxychloride. Table 1 shows the molybdenum content in the produced preparations. The results of the measurements of the exchange reactions of the intra-complex salts are given in tables 2 and 3. Table 3 shows that the exchange velocity is gradually reduced with the prolongation of the contact duration. This may be explained by the low diffusion velocity in the solid phase. In consequence of this the specific activity of the surface layers of the solid phase is reduced and approaches the specific activity of the solution. The existing exchange shows that the bond of

Card 2/3

The Isotopic Exchange in Some Intra-Complex Compounds of Hexavalent Molybdenum SOV 156 -58-1-15/46

the ion MoO_2^{2+} in the complexes has a mainly ionic character. The difference of the exchange velocity is explained apparently by the different solubility of the complexes investigated here. There are 3 tables and 1 Soviet reference.

ASSOCIATION: Kafedra neorganicheskoy khimii Moskovskogo gosudarstvennogo universiteta im. M. V. Lomonosova (Chair of Inorganic Chemistry of the Moscow State University imeni M.V. Lomonosov)

SUBMITTED: September 29, 1957

Card 3/3

SOV/74-27-2-1/5

AUTHORS: Nesmeyanov, An. N., Borisov, Ye. A. (Moscow)

TITLE: Chemical Effects of Atoms Produced by Nuclear Reaction (Khimicheskoye deystviye atomov, poluchayushchikhsya v rezul'tate yadernykh prevrashcheniy)

PERIODICAL: Uspekhi Khimii, 1958, Vol. 27, Nr 2, pp. 133 - 161 (USSR)

ABSTRACT: The article has to generalize the most recent results of the "chemistry of hot atoms". The data, which were not contained in the article of An. N. Nesmeyanov, L. A. Sazonov and I. S. Sazonov (Reference 1) and in chapter 8 of the book "The Utilization of Radioactivity in Chemical Investigations" (Reference 2) were particularly considered. The organic systems are principally treated.
In the (n,γ)-reaction the atom obtains a high kinetic energy and most frequently it tears off itself from the molecule. It was observed in experiments that molecules are formed by the emitted atom, which contain the initial isotope of the (n,γ)-reaction. This phenomenon is called "adherence"(uderzhaniye).

Card 1/3

SOV/74-27-2-1/5

Chemical Effects of Atoms Produced by Nuclear Reaction

The following chapters are treated:

I. The behavior of atoms, which are formed by the capture of slow neutrons.

1) The influence of temperature and state of aggregation on the "adherence" in organic compounds after (n,γ)-reaction.

2) The dependence of "adherence" on the mass of the colliding particles and on the initial energy of the emitted atoms, as regarded from the standpoint of the theory of elastical collision.

3) The influence of additions before the bombardment on the "adherence" in (n,γ)-reactions.

4) The dependence of "adherence" on the structure of alkyl halides.

5) The entering of emitted atoms into the molecules of substituted aromatic hydrocarbons.

II. The chemical behavior of atoms, which have been formed by other nuclear reactions resulting in an isotope of the initial element, as well.

1) The chemical behavior of atoms, which habe been formed by isomeric transmutation.

2) The chemical behavior of atoms, which have been formed by

Card 2/3

SOV/74-27-2-1/5

Chemical Effects of Atoms Produced by Nuclear Reaction

a (d,p)-, (n, 2n)- or (γ, n)-reaction. There are 12 figures, 15 tables, and 77 references, 9 of which are Soviet.

Card 3/3

AUTHORS: Nesmeyanov, An. N., Il'icheva, I. A. 76-32-2-28/38

TITLE: Measurement of the Saturated Vapor Pressure of Zinc and Cadmium According to the Isotopic Exchange Method (Izmereniye davleniya nasyshchennogo para tsinka i kadmiya metodom izotopnogo obmena)

PERIODICAL: Zhurnal Fizicheskoy Khimii, 1958, Vol. 32, Nr 2, pp. 422-427 (USSR)

ABSTRACT: Oneof the new methods of measurement is the isotopic exchange method (refs. 1 and 2) elaborated in the Laboratory for Radiochemistry at the State University, Moscow. Here the authors used a variant of it. In this variant the metal samples, active or not active, which are placed in a vacuum trap with constant temperature, are separated by a separating wall with a small aperture. This way the influence of the evaporation coefficient on the velocity of exchange (which plays a great part in the case where a membrane is lacking) is eliminated. An analogous method was used for the determination of the evaporation heat by A. A. Zhukhovitskiy

Card 1/2

76-32-2-28/38

Measurement of the Saturated Vapor Pressure of Zinc and Cadmium According to the Isotopic Exchange Method

(ref. 3). The calculation formula for the determination of the velocity of evaporation is given. The authors used long life radioactive isotopes of zinc and cadmium: Zn^{65} (T=250 days) and Cd^{113*} (T=5,1 years). According to the method of isotopic exchange through a membrane the saturated vapor pressure of zinc was measured within a temperature range of from 493 to 633°K and that of cadmium within a range of from 411 to 481°K. From the experimental data the sublimation heat of zinc and cadmium at the absolute zero point was computed. By these experiments the applicability of the method of isotopic exchange using a membrane for the determination of the saturated vapor pressures of metals is shown. There are 7 figures, 4 tables, and 8 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: December 11, 1956

1. Zinc--Vapor pressure 2. Cadmium--Vapor pressure 3. Vapor pressure--Measurement 4. Exchange reactions

Card 2/2

76-32-4-40/43

AUTHORS: Nesmeyanov, An. N., Iofa, B. Z., Strel'nikov, A. A.

TITLE: Determination of the Saturated Vapor Pressure of Solid $ZnAs_2$ (Davleniye nasyshchennogo para tverdogo $ZnAs_2$)

PERIODICAL: Zhurnal Fizicheskoy Khimii, 1958, Vol. 32, Nr 4, pp. 955-956 (USSR)

ABSTRACT: Already in a previous paper it was proved that the antimonides of zinc decompose in the solid phase in sublimation, while the arsenides of zinc and cadmium evaporate without decomposition. The determinations of pressure carried out in the present work were made according to the effusion method using the radioactive indicators Zn^{65} and As^{76}; the obtained results are mentioned on tables, the data of the pressure of saturated arsenic vapors having been taken from Horiba (Reference 6) and the melting diagram of the system Zn - As from the book by Khansen (Reference 7). From the results can be seen that the heat of sublimation of zinc arsenides differ strongly from each

Card 1/2

76-32-4-40/43

Determination of the Saturated Vapor Pressure of Solid $ZnAs_2$

other as well as from those of zinc and arsenic, from which fact it is concluded that $ZnAs_2$ sublimates (like Zn_3As_2) in the solid phase without decomposing; therefore a purification by vacuum sublimation is possible. In the absence of a dissociation of intermetallic compounds the measurement of the saturated vapor pressure can serve as method of the determination of these compounds in solid phases.
There are 2 figures, 2 tables, and 7 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: May 13, 1957

AVAILABLE: Library of Congress

Card 2/2

1. Zinc arsenides--Vapor pressure 2. Vapor pressure--Measurement 3. Zinc isotopes (Radioactive)--Applications 4. Arsenic isotopes (Radioactive)--Applications

AUTHORS: Lapitskiy, A.V., Nesmeyanov, An.N., Alekhin, S.P.

SOV/32-24-9-38/53

TITLE: Thermostat With Inset for Determining the Solubility (Termostaty s nasadkoy dlya opredeleniya rastvorimosti)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol 24, Nr 9, pp 1150-1151 (USSR)

ABSTRACT: To determine the solubility under isothermal conditions some parallel experiments must be carried out simultaneously, for which purpose the usual thermostat TS - 15 is not suited. For this reason a thermostat with a special inset was constructed, the design of which is given. In principle this inset consists of a metallic heat-insulated container in which six vessels are located. The latter have one stirrer each whereas a seventh stirrer stirs the container. The stirrers are driven by an electromotor by way of a mechanism which secures a simultaneous, equal revolution. A schematic representation of the thermostat plant, as constructed by the Engineers P.I. Mishkin and A.I. Natman, is given. The temperature control within the range 20° - 180° could be maintained to $\pm 0.1^{\circ}$. There are 2 figures.

Card 1/2 Moscow State Univ. im M.V. Lomonosov

5(4) SOV/20-123-6-29/50

AUTHORS: Nesmeyanov, An. N., Dë Dyk Man

TITLE: The Measurement of the Pressure of the Vapors of Cobalt and Nickel (Izmereniye davleniya parov kobal'ta i nikelya)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 6, pp 1064-1067 (USSR)

ABSTRACT: The author measured the vapour pressure and the Langmuir (Lengmyur) coefficient of cobalt and nickel according to the integral variant of the effusion method. The apparatus and the method of the experiment were discussed in a previous paper (Ref 7). The effusion chamber consisted of molybdenum. The aperture of the molybdenum diaphragm of the effusion chamber was changed from experiment to experiment. The chemical composition of the samples of nickel and cobalt are given. The cobalt sample was irradiated in an uranium nuclear reactor. Measurements were carried out in the usual way; they are described in short. The results obtained are given in a table and in 2 figures. Although these results have to be improved by

Card 1/2

SOV/20-123-6-29/50

The Measurement of the Pressure of the Vapors of Cobalt and Nickel

more precise measurements, they are the most precise hitherto available for nickel and cobalt. There are 2 figures, 2 tables, and 8 references, 3 of which are Soviet.

PRESENTED: July 21, 1958, by V. I. Spitsyn, Academician

SUBMITTED: July 18, 1958

Card 2/2

NESMEYANOV, An. N.

[illegible], L.P.; NESMEYANOV, An.N.

Opredelenie davleniya para okislov litiya, bora, kremniya i svin[illegible].

report submitted for the 5th Physical Chemical Conference on Steel Production.

Moscow - 30 [illegible]

NESMEYANOV, AN. N.

SOV/156-59-1-30/54

5(3)

AUTHORS: Stakhovich, V., Nesmeyanov, An. N.

TITLE: The Investigation of the Interaction of Ethyl Bromide With Bromine in the Field of X-rays by the Radioactive Indicator Method (Issledovaniye vzaimodeystviya bromistogo etila s bromom v pole rentgenovykh luchey metodom radioaktivnykh indikatorov)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1959, Nr 1, pp 120-122 (USSR)

ABSTRACT: Ethyl bromide with bromine, which had been dissolved therein in various concentrations ($0.4 \cdot 10^{-3}$ to $2.0 \cdot 10^{-3}$ g/mole) and to which Br^{82} had been added, was irradiated in the TRTs-3A apparatus at an X-ray dosage of 2.10^{16} ev/sec. The time of irradiation was varied between 24 minutes and 2 hours. After the irradiation nonactive bromine compounds, which corresponded in composition to the reaction products to be expected, and bromoform were added to the sample as carrier substances in a separating funnel and an aqueous solution of sodium bromide and sodium sulphate was admixed. After shaking, the water fraction was separated and the organic fraction dried over calcium chloride was rectified. The radioactivity was measured with a scintillometer. According to the tabulated results the

Card 1/3

SOV/156-59-1-30/54

The Investigation of the Interaction of Ethyl Bromide With Bromine in the Field of X-rays by the Radioactive Indicator Method

reaction products consist mainly of $C_2H_5Br^{82}$ and $C_2H_4BrBr^{82}$. A break of the C-C bond takes place only to a small extent. Higher boiling products are also formed. The contents of $C_2H_5Br^{82}$, CH_2BrBr^{82} and $CH_3CHBrBr^{82}$ increase with the concentration of bromine whereas the contents of higher boiling products decreases. A decrease in the yield of $CH_2BrCH_2Br^{82}$ is explained by secondary reactions between the starting product and primary radicals formed during the irradiation: $CH_3CH_2Br + R^{\cdot} \longrightarrow CH_2CH_2Br^{\cdot} + RH$. There are 1 figure and 3 tables.

ASSOCIATION: Kafedra neorganicheskoy khimii gosudarstvennogo universiteta im. M. V. Lomonosova (Chair of Inorganic Chemistry of State University imeni M. V. Lomonosov)

Card 2/3

SOV/156-59-1-30/54

The Investigation of the Interaction of Ethyl Bromide With Bromine in the Field of X-rays by the Radioactive Indicator Method

SUBMITTED: July 21, 1958

Card 3/3

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R001136630(

Nesmeyanov A.N

21(8) 5(0) SOV/55-59-3-29/32

AUTHOR: Lapitskiy, A.V.

TITLE: The First All-Union Conference of Universities and Colleges on Radiochemistry

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1959, Nr 3, pp 221-223 (USSR)

ABSTRACT: This conference was convened by the initiative of the laboratoriya radiokhimii khimicheskogo fakul'teta MGU (Laboratory of Radiochemistry of the Department of Chemistry of Moscow State University) and was held in Moscow from April 20 to April 25, 1959. It was attended by professors, teachers, and scientific collaborators of 32 universities and colleges of the Soviet Union. In his opening address, An.N.Nesmeyanov, Doctor of Chemical Sciences, stressed the importance of radiochemistry. 30 lectures were delivered by members of Moscow State University: Laboratoriya yadernoy fiziki (Laboratory of Nuclear Physics): N.P Rudenko. A.I.Sevast'yanov: Production of Beryllium-7 by the Reaction (T,2n): I.Starý, N.P.Rudenko: Production of Radioactive Isotopes by Extraction as β-Diketonates. Laboratoriya radiokhimii (Laboratory of Radiochemistry): An.N.

Card 1/4

Nesmeyanov, B.Z. Korolev, L.A.Sazonov: Separation of Radioactive Isotopes in the Irradiation of Colloids; An.N.Nesmeyanov, Ye.A.Borisov, E.S.Filatov, V.Kondratenko, Chzhan Tszi-zyan, K.Panek, B.Shmula: Secondary Reactions of the Recoil Atoms ^{80}Br and ^{82}Br in Methyl Bromides; B.G.Dzantiyev, I.M.Barkalov, V.V.Khrapov: Reactions of "Hot" Sulfur- and Nitrogen Atoms With Hydrocarbons; B.Z.Iofa, L.T.Bobrov, A.N.Ratov: The State of Radioactive Isotopes in Extremely Dilute Solutions; M.B. Neruklova, I.V.Melikhov: General Theory of the Coprecipitation of Radioactive Elements With Non-isomorphous Crystalline Precipitates; A.V.Lapitskiy, I.A.Savich, Chzhuan Ta-yuy: Coprecipitation of Protactinium With Complex Compounds of Ti, Nb, and Ta; V.M.Fedoseyev, V.V.Ivanachev, V.N.Bochkarev: Application of Radioactive Paper Chromatography"; K.B. Zaborenko, A.M.Babeshkin, Z.S.Mal'chenko: Accumulation and Separation of Recoil Atoms on the Basis of the Example Ra^{224} and Ra^{220}; K.B.Zaborenko, A.M.Babeshkin, V.A.Beyevskaya, L.L.Melikhov: Application of the Emanation Method for the

Card 2/4

Investigation of the Transformation of Solids; V.I.Spitsyn, K.B.Zaborenko, A.M.Babeshkin, K.A.Radicheva: Transformation of Heteropoly-compounds; K.B.Zaborenko, A.M.Babeshkin, I.I. Kovalenko: Geochemistry of Radium; K.B.Zaborenko, V.I. Korobkov: Microanalytical Determination of Uranium by Means of Nuclear Emulsions. An.N.Nesmeyanov, Do Dyk-Man: Partial Vapor Pressure of Co in Alloys With Ni; Yu.A.Priselkov, Yu.A. Sapozhnikov, A.V.Tseplyayeva, V.V.Karelin: The Behavior of a Molecular Metal Beam in the High-frequency Field; I.V.Golubtsov, A.V.Lapitskiy, V.K.Shiryayev: Vapor Pressure of Niobium Dioxide; I.V.Golubtsov, Yu.A.Likhachev, Ye.K.Bakov: Various Constructions of the Scintillation Attachment to the Apparatus of the Type B. Kafedra analiticheskoy khimii (Chair of Analytical Chemistry): I.P.Alimarin, N.P.Borzankara: Niobium^{95} as a Radioactive Tracer; I.P.Alimarin, T.A.Belyavskaya, Hu Bin-ven': Sorption of Zr by Ion Exchangers; A.I.Busev, V.M. Byr'ko: The Use of Complex Pyrazolindithiocarbamates in Radiometry. Kafedra neorganicheskoy khimii (Chair of Inorganic Chemistry): Ye.A. Ippolitova, Yu.P.Simanov, L.M.Kovba, G.P. Polunina, I.A. Berezhnikova: Uranates of Some Bivalent Metals; L.G.Knyazeva, O.G., Henkova: Uranium Compounds With Acids of Low-valence P; V.I. Spitsyn: The Influence of the Radioactive Radiation of Solids on Their Physico-chemical Properties; I.Ye.Mikhaylenko, V.I.Spitsyn: Isotope Exchange in the System $K_2SO_4 - SO_3$ at High Temperature. Kafedra khimicheskoy kinetiki

Card 3/4

(Chair of Chemical Kinetics): I.V.Berezin, V.L.Antonovskiy, N.F.Kazanskaya: Application of Tritium for the Purpose of Determining the Velocity Constants of the Separation of Organo-Hydrogen Compounds. An.N.Nesmeyanov delivered a detailed lecture on the Methodology of Radiochemical Instruction at the chemical departments of universities.

NESMEYANOV, An.N.; BORISOV, Ye.A.; ZVARA, I.

Chemical action of radioactive bromine atoms formed in the reaction of bromine with neutrons in halogen derivatives of methane. Radiokhimiia 1 no.3:325-335 '59. (MIRA 12:10)
(Bromine) (Methane)

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R001136630(

NESMEYANOV, An.N.; KOROLEV, B.M.; SAZONOV, L.A.

Separation of radioactive isotopes during irradiation of MnO_2 colloids. Radiokhimiia 1 no.6:694-699 '59. (MIRA 13:4)

(Manganese--Isotopes)

NESMEYANOV, An.N.; BORISOV, Ye.A.; FILATOV, E.S.; KONDRATENKO, V.I.; CHZHAN TSZE-SYAN [Chang Chieh-hsiang]; PANEK, K.; SHUKLA, B.V.

Secondary reactions of the recoil atoms bromine-82 and bromine-80m in bromomethanes. Radiokhimiia 1 no.6:712-716 '59. (MIRA 13:4)

(Bromine--Isotopes) (Methane)

21(5),21(0) S/153/59/002/06/028/029
B115/B000

AUTHORS: Lapitskiy, A.V., Nesmeyanov, An.N.

TITLE: First All-Union Conference of the Institutions of Higher Learning of the USSR on Radiochemistry

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1959, Vol 2, Nr 6, pp 974-977 (USSR)

ABSTRACT: The first All-Union Conference of the Institutions of Higher Learning on Radiochemistry organized on the occasion of the lectures held at the MGU on Lomonosov to celebrate the 50th anniversary of the book on "Materialism and Empiriocriticism" by Lenin took place from April 20 to 25, 1959 in Moscow. 83 lectures were held by lecturers from 17 institutions of higher learning. About 400 persons from 32 institutions of higher learning of the USSR took part in the Conference. The inaugural address was held by the chairman of the organization committee An.N. Nesmeyanov. The lectures dealt with methods used to isolate and concentrate radioactive isotopes, chemism of radioactive elements occurring in nature, chemical properties of "hot" atoms, synthesis of tagged compounds, state of micro-components of radioactive elements in solid solutions, coprecipitation of

Card 1/4

First All-Union Conference of the Institutions of Higher Learning of the USSR on Radiochemistry S/153/59/002/06/028/029 B115/B000

radioactive elements, reaction mechanism and isotope exchange, use of isotopes as indicators in thermodynamics of metals, oxides, and salts in analytical, inorganic, organic, and other fields of chemistry, methods of teaching, devices and measuring technique, and planning of radiochemical laboratories. Lecturers were: N.P.Rudenko, A.I.Sevast'yanov, V.B.Shevchenko, I.A.Fedorov, V.V.Pushkarev, L.D.Skrylev, V.F.Bagretsov, B.Z. Iofa, I.Stary, B.K.Preobrazhenskiy, V.P.Meleshko, V.B.Voytovich, A.F.Bogoyavlenskiy, V.T.Belov, Ye.M.Kozyrev, D.N.Strazhesko, G.F.Yanovskiy, L.P.Boykov, V.I.Paramonova, A.N.Mosevich, N.V. Goryanin, Yu.V.Yegorov, Ye.V.Tkachenko, V.D.Puzako, O.Ye. Zvyagintsev, O.I.Zakharov-Nartsissov, K.B.Zaborenko, A.M. Babeshkin, I.V.Kovalenko, V.V.Cherdyntsev, L.I.Shmonin, L.L. Kashkarov, V.F.Ostapenko, O.D.Khaldeyev, Ye.A.Isabayev, U.Kh. Asylbayev, Ye.A.Ippolitova, Yu.P.Simanov, L.M.Kovba, G.P.Polunina, I.A.Bereznikova, V.G.Knyaginina, O.G.Nemkova, V.M.Vdovenko, D.N.Suglobov, I.G.Suglobova, V.D. Nefedov, Yu.A.Grachev, Yu.A.Ryukhin, M.A.Toropova, V.A.Bykhovtsev, U-Tszi-Lan', S.A. Grachev, An.N.Nesmeyanov, Ye.A.Borisov, E.S.Filatov, V.N. Kondratenko, Chzhan-tsze-syan, B.Shukla, K.Panek, B.G.Dzantiyev,

Card 2/4

First All-Union Conference of the Institutions S/153/59/002/06/028/029
of Higher Learning of the USSR on Radiochemistry B115/B000

N.M.Barkalov, V.V.Khrapov, M.S.Aul'chenko, V.I.Spitsyn, I.Ye. Mikhaylenko, Yu.Ya.Fialkov, Ye.N.Sinotova, V.D.Trenin, I.A. Korshunov, A.P.Batalov, A.A.Orlova, M.Vobetskiy, L.N.Yevtikheyev, Yu.N.Loginov, O.K.Skarre, V.F.Grechanovskiy, V.L.Antonovskiy, I.V.Berezin, N.F.Kazanskaya, V.M.Fedoseyev, V.A.Beyevski, L.L. Melekhov, M.A.Rodicheva, B.M.Korolev, L.A.Sazonov, A.I.Shafiyev, L.V.Bobrov, A.P.Ratov, I.P.Alimarin, I.A.Belyavskaya, Mu-Bin-Ven', A.S.Koreyohuk, B.A.Shishlyakova, A.V.Lapitskiy, Chzhuan-Ya-Uy, I.A.Savich, V.P.Shvedov, S.G.Strizhov, Chin-Tsze-Khou, M.S.Merkulova, L.L.Makarov, I.V.Melekhov, G.S.Popov, A.N.Popkov, D.Yu.Stupin, Yu.G.Vlasov, B.G.Lur'ye, A.N.Murin, A.V.Stepanov, Yu.V.Morachevskiy, V.N.Zaytsev, A.P.Taranov, Chzhan-Kho, A.I. Novikov, Kh.Ya.Kuus, I.M.Korenman, Ya.D.Zel'venskiy, V.A. Shalygin, A.P.Musakin, G.A.Skorobogatov, De Dyk-man, Yu.A. Priselkov, Yu.A.Sapozhnikov, A.V.Tseplyayeva, V.V.Karelin, I.V.Golubtsov, V.K.Sniryayev, D.K.Belashchenko, A.D.Sotskov, Gao-I-Shan', A.A.Zhukhovitskiy, G.B.Fedorov, Yu.F.Babikov, P.L.Gruzin, F.I.Zhomov, G.G.Ryabov, S.M.Kochergin, G.R. Pobedimskiy, V.I.Shamayev, A.I.Busev, V.M.Byr'ko, V.I.Korobkov, N.P.Borzenkova, Yu.A.Likhachev, Ye.K.Bakov, K.A.Petrzhak, and

Card 3/4

First All-Union Conference of the Institutions of Higher Learning of the USSR on Radiochemistry

S/153/59/002/06/028/029
B115/B000

R.V.Sedletskiy. The lecturers mentioned were deputies of the following institutions of higher learning and institutes: MGU, MKhTI im.Mendeleyeva, Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institute), LGU, Voronezhskiy gosudarstvennyy universitet (Voronezh State University), Kazanskiy aviatsionnyy institut (Kazan' Institute of Aviation), Kiyevskiy meditsinskiy institut (Kiyev Medical Institute), Kazakhskiy gosudarstvennyy universitet (Kazakhskiy State University), Kiyevskiy politekhnicheskiy institut (Kiyev Polytechnic Institute), Gor'kovskiy gosudarstvennyy universitet (Gor'kiy State University), Leningradskiy tekhnologicheskiy institut (Leningrad Technological Institute), Tadzhikskiy gosudarstvennyy universitet (Tadzhikskiy State University), Tartuskiy gosudarstvennyy universitet (Tartu State University), Moskovskiy institut stali (Moscow Institute of Steel), Moskovskiy inzhenerno-fizicheskiy institut (Moscow Institute of Technical Physics), and Kazanskiy khimiko-tekhnologicheskiy institut (Kazan' Institute of Chemical Engineering). The lectures held on the Conference will be published in the periodical "Radiokhimiya" and in this periodical.

Card 4/4

SOV/78-4-1-40/48

5(4)

AUTHORS: Nesmeyanov, An. N., Sazonov, L. A.

TITLE: The Measurement of the Saturation Vapor Pressure of Anhydrous Lanthanium Chloride by the Method of Radioactive Indicators (Izmereniye davleniya nasyshchennogo para bezvodnogo khlorida lantana metodom radioaktivnykh indikatorov)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 1, pp 230-231 (USSR)

ABSTRACT: The vapor pressure of lanthanium chloride was measured by the method of Knudsen y means of a radioactive indicator. The experimental results are shown in the coordinate system $\log P - \frac{1}{T}$ for the saturation vapor pressure of $LaCl_3$. The equation of the vapor pressure is as follows: $\log P_{mmHg} = -\frac{15284}{T} + 11.9163$. The sublimation heat calculated from the inclination of the straight line $\log P - \frac{1}{T}$ is $\Delta H_T = 69.93$ kcal/mol. The evaporation heat is 59.6 kcal/mol. It clearly differs from the value 53.3 kcal/mol reported by

Card 1/2

SOV/78-4-1-40/48

The Measurement of the Saturation Vapor Pressure of Anhydrous Lanthanium Chloride by the Method of Radioactive Indicators

Harrison (Ref 1). There are 1 figure, 1 table, and 4 references, 1 of which is Soviet.

SUBMITTED: July 23, 1958

Card 2/2

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R001136630(

SOV/78-4-1-41/48

5(4)

AUTHORS: Nesmeyanov, An. N., Sazonov, L. A.

TITLE: The Measurement of Saturation Vapor Pressure of Lithium Chloride (Izmereniye davleniya nasyshchennogo para khloristogo litiya)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 1, pp 231-233 (USSR)

ABSTRACT: The saturation vapor pressure of lithium chloride was investigated by the method of Knutsen (Knudsen). Anhydrous lithium chloride was produced from aqueous lithium chloride. The sublimation heat in the temperature range from 808 to 890°K was calculated from data on vapor pressure; a value of 46.810 kcal/mol was found. Data on evaporation and sublimation heat by various authors are summarized in table 2. For ΔH^{o}_{0} (sublimation heat at 0°K) the value 53.72 ± 0.12 kcal/mol was calculated from the data on the vapor pressure of monomeric lithium chloride at 870°K.
There are 1 figure, 2 tables, and 8 references, 2 of which are Soviet.

~~Card 1/2~~

1/1

SOV/78-4-10-2/40

5(2)

AUTHORS: Yevseyev, A. M., Pozharskaya, G. V., Nesmeyanov, An. N., Gerasimov, Ya. I.

TITLE: Vapor Pressure of Lithium Fluoride

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 10, pp 2189-2191 (USSR)

ABSTRACT: The determination of the vapor pressure was carried out according to the effusion method in a nickel chamber because this metal does not react with lithium fluoride. The temperature of the chamber was measured with a Pt-PtRh-thermocouple and a potentiometer of the PPTN-1 type and the galvanometer of the M21/4 type. The easily volatile impurities (Li_2CO_3, LiOH) were removed by heating in vacuo up to 700°. The results of the determination are presented in table 1; figure 1 shows the dependence of the vapor pressure of LiF on the temperature in the range of from 926 - 1026.5°K. From this the heat of sublimation for the absolute zero point was found to be 60.64 kcal/mole. The value is in good agreement with the calculation made by the Institut goryuchikh iskopayemykh Akademii nauk SSSR (Institute of Mineral Fuels of the Academy

Card 1/2

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R001136630(

SOV/78-4-10-2/40

Vapor Pressure of Lithium Fluoride

of Sciences, USSR), which gave 60.74±0.1 kcal/mole. There are 1 figure, 2 tables, and 3 references, 1 of which is Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 20, 1958

Card 2/2

5(4)

SOV/78-4-2-36/40

AUTHORS: Nesmeyanov, An. N., Iofa, B. Z.

TITLE: Saturated Vapor Pressures of Solid Lead Fluoride (Davleniya nasyshchennogo para tverdogo ftoristogo svintsa)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 2, pp 486-488 (USSR)

ABSTRACT: In the investigation under review the saturated vapor pressure of solid lead fluoride was determined by the Knudsen effusion method and by means of the radioactive lead isotope RaD. Lead fluoride was obtained by the precipitation of lead nitrate by fluoric acid in platinum vessels. The precipitate was dried at 120°. The dependence of the logarithm of the saturation steam pressure on the temperature is shown in equation (3):

$$\log P_{[at]} = -\frac{9096.2}{T} + 5.4696 \quad (3)$$

The dependence log P-1/T is shown in figure 3. The results were compared to those obtained by Wartenberg and Bosse (Ref 1) and it was found that the straight line, which shows the dependence of the logarithm of the vapor pressure on the reci-

Card 1/2

Nesmeyanov, An. N.

5(2) SOV/78-4-10-3/40

AUTHORS: Khandamirova, N. E., Yevseyev, A. M., Pozharskaya, G. V., Borisov, Ye. A., Nesmeyanov, An. N., Gerasimov, Ya. I.

TITLE: Pressure of Saturated Vapor of Beryllium Fluoride

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 10, pp 2192-2195 (USSR)

ABSTRACT: Beryllium fluoride was produced according to the method of A. V. Novoselova from beryllium sulfate. The vapor pressure was measured by means of effusion in vacuum and determination of the weight lost during the experiment (Method 1) or by analysis of the resultant condensate (Method 2). The effusion chamber in method 1 was made of tantalum (Fig 1) and was heated by a "Mars"-electric furnace with a power of 1200 w, the temperature was checked thermoelectrically by means of the PPTN-1 potentiometer. In method 2 the effusion chamber consisted of molybdenum. The condensate was analyzed with the colorimetric photometer of the FEK-52 type by using the reagent "Berillon-II IREA". Both methods gave values in good agreement which are given in table 1. By means of the values obtained and of the data found by the Institut goryuchikh iskopayemykh

Card 1/2

Akademii nauk SSSR (Institute of Combustible Minerals of the Academy of Sciences, USSR) for the thermodynamic potentials of the gaseous and solid beryllium fluoride the heat of sublimation was calculated to be 55.2 ± 0.6 kcal/mole at $0^{\circ}K$, which is also given in table 1. Table 2 compares this value with the data obtained by K. A. Sense et al (Ref 1) and the value computed on the basis of the 3rd law of thermodynamics. There are 2 figures, 2 tables, and 1 reference.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 20, 1958

Card 2/2

SOV/78-4-10-4/40

5(2)

AUTHORS: Yevseyev, A. M., Pozharskaya, G. V., Nesmeyanov, An. N., Gerasimov, Ya. I.

TITLE: Vapor Pressure of Aluminum Fluoride

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 10, pp 2196-2197 (USSR)

ABSTRACT: The papers available so far on the problem mentioned in the title (Refs 1-3) are mentioned in brief and the results obtained by W. Olbrich (Ref 2) and I. I. Naryshkin (Ref 3) were denoted as inexact. The determination of the vapor pressure of AlF_3 was carried out in the temperature range of 980-1123°K in a platinum effusion chamber. The device has already been described in a previous paper (Ref 4). The data obtained are given in table 1. From the experimental data and the heat capacities (these were calculated in Institut goryuchikh iskopayemykh Akademii nauk SSSR - Institute of Combustible Minerals of the Academy of Sciences, USSR) a heat of sublimation of 73.46 kcal/mole at 0°K resulted. Table 2 compares the values obtained with the data of references 1-3. There are 1 figure, 2 tables, and 4 references, 2 of which are

Card 1/2

Soviet

NESMEYANOV, AN. N.

GINZBURG, F.L.

21 (0), 5 (0)

AUTHOR: Shchebetkovskiy, V. N. SOV/89-7-2-17/24

TITLE: All-Union Symposium on Radiochemistry (Vsesoyuznyy simposium po radiokhimii)

PERIODICAL: Atomnaya energiya, 1959, Vol 7, Nr 2, pp 175-176 (USSR)

ABSTRACT:
A symposium was held in Leningrad from 3 to 5 March 1959. More
than 200 participants from different institutes in Moscow,
Leningrad, Kiyev, Novosibirsk, Tbilisi and Gor'kiy attended it.
Twentyeight papers were read. The following are mentioned: I. Ye.
Starik: On the problem of the molecular state of micromasses of
radioactive elements in solutions; I. Ye. Starik, N. I. Ampelogova,
F. L. Ginzburg, L. I. Il'menkova, I. A. Skul'skiy, L. D. Sheydina:
Condition of radioactive elements occurring in microconcentrations
of solutions (Zr, Am, Pa, Po). M. N. Yakovleva, M. A. Shurshalina:
Application of the dialysis method for examination of uranium
carriers in natural bodies of water. V. I. Paramonova, Ye. F.
Latysheva, Complex formation of the multivalent ruthenium with
chlorine ions. K. B. Zaborenko, A. V. Zaral'skaya, V. V. Fomin:
Determination of the composition and the instability constants
by ion exchange of the cerium oxalate complexes. A. I. Moskvin:
Complex formation of plutonium and americium with the anions of

Card 1/3

ethylene diamine tetra acetic acid (EDTA) and oxalic and
phosphoric acid. A. M. Trofimov, L. N. Stepanova: A new method
for the determination of ion charges of radioactive elements in
solutions by application of ion exchanging resins of different
swelling capacities. N. B. Vysokoostrovskaya, A. M. Trofimov,
B. N. Nikol'skiy: Confirmation of the non-existence of complex
formation between potassium and EDTA by application of the ion
exchange and the potentiometric methods. V. M. Vdovenko, Ye. A.
Smirnova: Determination of the conditions of compounds to be
extracted in the organic phase (hydration of uranyl nitrate with
ester). V. M. Vdovenko, N. V. Alekseyeva: Degree of hydration of
nitric acid in dibutyl ether of the diethylene glycol. V. M.
Vdovenko, A. S. Krivokhatskiy: Degree of solvation of the nitric
acid in the dibutyl ether of the diethylene glycol. A. K.
Lavrukhina: Determination of the dependency of the distribution
coefficients between the organic and the watery phases in order
to determine the condition of the substance in the solution and
to fixate the concentration range at which complex formation
starts. V. I. Kuznetsov, P. D. Titov lectured on extraction of
hexavalent tungsten with aniline from hydrochloric media. An. N.
Nesmeyanov on substitution of hydrogen in benzol by the recoil

Card 2/3

atoms P^{32}, As^{76} and Sb^{124}. B. G. Dzantiyev lectured on the
recoil atoms from the reactions of $Li^6(n,\alpha)T$, $N^{14}(n,p)C^{14}$ in
a medium of cyclic hydrocarbons. P. I. Artyukhin lectured on
the influence of the NO_3 and H^+ ions on the reduction velocity
of hexavalent plutonium under the influence of its own
α-radiation. In the course of thorough discussions it was
established that the comprehension of the condition of radioactive
elements in solution are of eminent importance for the whole
range of radio chemistry. More studies have to be made in this
field as were made before. A better coordination of all the
institutes which are occupied with this problem will yield
good results in the future.

5(4)

(Moscow)

SOV/74-28-2-1/5

AUTHORS: Nesmeyanov, An. N., Khandamirova, N. E./

TITLE: Influence of the Langmuir Coefficient and the Molecular Vapor Composition on the Results of Vapor Pressure Measurement (Vliyaniye koeffitsiyenta Lengmyura i molekulyarnogo sostava para na rezul'taty izmereniya davleniya para)

PERIODICAL: Uspekhi khimii, 1959, Vol 28, Nr 2, pp 117-132 (USSR)

ABSTRACT: In the present survey the authors tried to generalize data on the nature of the Langmuir coefficient and on its influence on the results during the vapor pressure measurement according to the rate of sublimation. Besides, the most important methods for determination of this coefficient and the vapor composition were indicated by the authors. The factors mentioned are in numerous cases of decisive importance to obtaining accurate results. In Soviet publications these problems have not been investigated in recent time. The most frequently used methods for determination of the rate of sublimation are the methods devised by Langmuir (Refs 8,9,10) and Knudsen (Refs 11,12,13). In recent time the method of isotope exchange has been introduced for application. The Langmuir method is based on

Card 1/5

SOV/74-28-2-1/5

Influence of the Langmuir Coefficient and the Molecular Vapor Composition on the Results of Vapor Pressure Measurement

the determination of the rate of evaporation (sublimation) of the substance from the open surface into vacuum. It can be calculated according to the formula adjoining:

$G = p\sqrt{\frac{M}{2\pi RT}}$ (3), where G denotes the quantity of the evaporated substance per unit of time and per cm^2 surface under heating up to T°. If conditions occur which complicate the condensation of particles on the surface to the effect that they transform into vapor again, the coefficient α is substituted into the formula (3)

$G = \alpha p\sqrt{\frac{M}{2\pi RT}}$ (4). The coefficient determines the ratio between the number of the particles condensed on the surface and those hitting it

$\alpha = \frac{\nu_3}{\nu_2}$ (8). The coefficient α may also be expressed by the following formula (Ref 5):

Card 2/5

SOV/74-28-2-1/5

Influence of the Langmuir Coefficient and the Molecular Vapor Composition on the Results of Vapor Pressure Measurement

$\alpha = \frac{Q_v}{Q_i} e^{-E/RT}$ (9), where Q_v denotes the function of the energy state of an intermediate layer in sublimation, Q_i is the function of the energy state of the condensed phase, and e is the activation energy in sublimation. Substances the coefficient α of which possesses a little value are characterized by a number of specific properties. These refer to the presence of an energy barrier and the necessity of an additional activation energy during sublimation. The influence of the surface relief, of the purity of the surface, of the difference between the molecular composition of vapor and that of the condensed phase on the sublimation rate is finally dependant on the difference between the number of particles hitting the surface and the number of particles which are condensed on the surface during equilibrium. The coefficient α given in formula (4) is marked as the Langmuir coefficient. In publications only indirect methods for determination of

Card 3/5

SOV/74-28-2-1/5

Influence of the Langmuir Coefficient and the Molecular Vapor Composition on the Results of Vapor Pressure Measurement

this coefficient are described several of which are indicated in this paper. The coefficient can be computed according to data given for vapor pressure by Langmuir's and Knudsen's methods in accordance with the formula adjoining:

$\alpha = \frac{p_L S - p_K a K}{p_K S}$ (11), where p_L denotes the pressure of saturated vapor, measured according to Langmuir's method; p_K is the pressure of saturated vapor, measured according to Knudsen's method, K is the Clausing coefficient and S denotes the evaporating surface. The coefficient can be calculated according to the measurement results of sublimation rate and by means of direct determination of pressure of saturated vapor (Ref 24). The period of equilibrium stabilization between vapor and condensed phase may also serve for its determination. The transition of a substance from the solid or liquid state into the gaseous state may take place in various ways (Ref 43): 1) by simple evaporation thus causing formation of molecules

Card 4/5

Influence of the Langmuir Coefficient and the Molecular Vapor Composition on the Results of Vapor Pressure Measurement

SOV/74-28-2-1/5

in the gas phase which correspond to the composition of the condensed phase; 2) by evaporation whereby a gas phase containing polymeric (mainly dimeric) molecules is obtained; 3) by evaporation accompanied by dissociation of molecules or redistribution of valences in them. The most frequently method is the one indicated in point 2. Furthermore, methods for investigation of the gas phase composition are described: 1) measurements of velocity of motion of molecules; 2) measurements of the deviation of the molecular bundle in the magnetic field; 3) magnetic resonance; 4) spectroscopic method; 5) mass-spectroscopic method; 6) torsion variation of the effusion method; 7) determination of vapor density; 8) dynamic method. In conclusion it may be stated that, at present, there are no reliable data on the composition of vapors available, since the results obtained for the same substances by various methods vary considerably. There are 7 figures and 103 references, 16 of which are Soviet.

Card 5/5

5(3)

SOV/79-29-5-63/75

AUTHORS: Fedoseyev, V. M., Kovalenko, S. P., Silayev, A. B., Nesmeyanov, An. N.

TITLE: S-Derivatives of Thiourea (S-proizvodnyye tiomocheviny). 1. Synthesis of N-Acetyl- and N,N-Diethyl-2,3-diisothiuronium Propyl Amine (1. Sintez N-atsetil- i N,N-dietil-2,3-diizotiuroniypropilamina)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 5, pp 1703-1707 (USSR)

ABSTRACT: Two new S-derivatives of thiourea were produced: dibromide of bromine hydrate of N,N-diethyl-2,3-diisothiuronium propyl amine and dibromide of N-acetyl-2,3-diisothiuronium propyl amine. The course of the synthesis and the values of the elementary analysis are given. The synthesis was controlled by paper chromatography; furthermore, it was repeated with marked atoms (S^{35}). The reaction between 2,3-dibromopropyl amine and thiourea in butanol solution at 80° does not lead to the formation of dibromide of the bromine hydrate of 2,3-diisothiuronium propyl amine. Bromide of the bromine hydrate of 2-amino-5-isothiuronium methyl thiazoline is probably formed in this connection. There are 1 table and

Card 1/2

SOV/79-29-5-63/75

S-Derivatives of Thiourea. 1. Synthesis of N-Acetyl- and N,N-Diethyl-2,3-diisothiuronium Propyl Amine

11 references, 1 of which is Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: February 6, 1958

Card 2/2

SOV/76-33-2-17/45

5(4)

AUTHORS: ~~Nesmeyanov, An. N.,~~ Smakhtin, L. A., Choporov, D. Ya., Lebedev, V. I.

TITLE: An Investigation Into the Thermodynamics of Solid Solutions of Gold, Silver, and Copper I (Issledovaniye po termodinamike tverdykh rastvorov zolota s serebrom i med'yu I)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 2, pp 342 - 348 (USSR)

ABSTRACT: Because the components of solid solutions have such an exceptionally low vapor pressure investigations of the thermodynamic properties of such solutions by measurement of the partial pressure are very difficult. These measurements could be facilitated by the use of radioactive isotopes. In this paper data are given for the vapor pressure of solid Au, Ag, and Cu, since the literature data for the pressure of saturated vapor of these metals are very contradictory. Pure metals (99.9%) and the radioactive isotopes Au^{198}, Ag^{110}, and Cu^{64} were used. The vapor pressure was measured using the effusion method of Knudsen and an appropriate apparatus (Fig 1). The effusion space was produced from molybdenum. From the experi-

Card 1/3

SOV/76-33-2-17/45

An Investigation Into the Thermodynamics of Solid Solutions of Gold, Silver, and Copper I

mental data on the vapor pressure (Tables 1-3) the following equations were obtained using the method of least squares: for Ag in the interval 770-960°C lg p = -14058/T+8.8550; for Au at 820-1050°C lg p = -18016/T+8.6833; for Cu at 920-1080°C lg p = -17320/T+9.320. The latent heats of sublimation at absolute zero ΔH_0^o, were calculated and the following results were obtained: for Ag 67630±50 cal/gram atom; Au 87520±110 cal/gram atom; Cu 80980±140 cal/gram atom. A comparison of the data obtained with those of other authors (concerning the pressure of the saturated vapors of solid Ag) (Figs 2-4) indicates that the most reliable data are given in the paper by Macabe and Birchenall (Makeyb) (Ref 4) and in the present paper, while the values found by Shadel and Birchenall (Ref 5) are too high and the values found by Harteck (Gartek) (Ref 6), Langmuir (Lengmyur) (Ref 7), and An.N.Nesmeyanov et al (Ref 8) are too low. The most reliable values for liquid Ag were obtained by Fischer (Fisher)(Ref 9). Data on the vapor pressure of solid Cu by Hersh (Gersh)(Ref 10), Marchall, Dornte and Norton (Marshal)

Card 2/3

An Investigation Into the Thermodynamics of Solid Solutions of Gold, Silver, and Copper I

SOV/76-33-2-17/45

(Ref 11) and in the present paper are in good agreement. The values given by Downing, Edwards and Heriek (Douning, Edvards)(Ref 12) are too high and those by Harteck are too low. The most reliable data for liquid Cu are those given by Hersh. There are 4 figures, 3 tables, and 12 references, 2 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 9, 1957

Card 3/3

SOV/180-59-3-32/43

AUTHORS: Nesmeyanov, An.N. and Firsov, L.P. (Moscow)

TITLE: The Vapour Pressure of the Oxides of Lithium, Beryllium, Boron, Silicon and Lead

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 3, pp 150-151(USSR)

ABSTRACT: Previous values (Ref 1-9) had shown disagreement. The vapour pressures of the oxides were measured by the effusion method. The rate of evaporation from an uncovered surface in vacuo was also measured for Be, Si and Pb oxides. The apparatus was so constructed that a whole series of measurements could be taken without breaking the vacuum. Experiments were carried out to find the best construction materials giving least reaction with the oxides. It was shown that nickel or platinum should be used for lithiumoxide, molybdenum or tantalum for silicon and boron oxides, tungsten or cermets for beryllium oxide and cermets for lead oxide. It was shown that all the oxides had coefficients of condensation approximately 1, and evaporated with no change in the molecular structure. A list of equations of the relation between pressure

Card 1/2

SOV/180-59-3-32/43

The Vapour Pressure of the Oxides of Lithium, Beryllium, Boron, Silicon and Lead

and temperature is given for various oxides in the order Li, Be, B, Si, Pb. There are 10 references, 9 of which are English and 1 Soviet.

Card 2/2

SOV/76-33-3-15/41

5(4), 18(6)

AUTHORS: Nesmeyanov, An. N., Smakhtin, L. A., Lebedev, V. I.

TITLE: Investigation of the Thermodynamics of Solid Solutions of Gold With Silver and Copper.II (Issledovaniye po termodinamike tverdykh rastvorov zolota s serebrom i med'yu. II)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 3, pp 599 - 606 (USSR)

ABSTRACT: In a previous paper (Ref 1) investigations were carried out on the pressure of saturated vapors of solid Au, Ag, and Cu by means of radioactive isotopes Au^{198}, Ag^{110}, and Cu^{64} according to the Knudsen method. In the present paper experimental results are described concerning the partial pressures of gold, silver and copper in solid solutions. The experimental data (Tables 1,2) were worked out according to the method of the least squares and represented as straight lines $\lg P_i = A + B/T$. The activities in the case of 1250 and 1111°K were calculated from the equations for the pressure of the saturated vapors of the pure metals and the partial

Card 1/3

Investigation of the Thermodynamics of Solid Solutions of Gold With Silver and Copper.II SOV/76-33-3-15/41

pressures in the case of Au, Ag, and Cu in the alloys Au-Ag and Au-Cu. By means of the experimentally obtained values of the activity coefficients (Tables 1,2) and the equation according to Gibbs-Duhem both activity coefficients in the concentration range of from 0.2 N_i to 0.8 N_i were calculated according to the method of successive approximations at graphic integration. Equations on the relation between the activities of the components of the alloys and the temperature in form of linear functions lg a_i - 1/T were calculated from the values of the activity coefficients for the two above-mentioned temperatures (Tables 3,4); herefrom several thermodynamic partial and integral functions of solid solutions (Tables 5,6) were derived. The majority of the results obtained is in good agreement with the publication data. On comparing the experimental results obtained with the approximations of the theory of solid solutions only a qualitative agreement was to be observed which means a limited applicability of these approximations. The observed excess entropy of mixing is considered to be due to the Variation

Card 2/3

Investigation of the Thermodynamics of Solid Solutions of Gold With Silver and Copper.II

SOV/76-33-3-15/41

of the oscillation frequency of the atoms in the crystal lattice on the transition metal → alloy. There are 4 figures, 8 tables, and 16 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 9, 1957

Card 3/3

66179

~~5(4)~~ 5.2100(A) SOV/20-128-5-33/67

AUTHORS: Belykh, L. P., Nesmeyanov, An. N.

TITLE: Measurement of the Vapor Pressure Which Is in Equilibrium With Solid Beryllium Oxide

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 5, pp 979-980 (USSR)

ABSTRACT: After a brief survey of publications by Western authors devoted to the investigation of the volatility of BeO, the authors describe the checking of these data. Investigations were made within the temperature range 2,103-2,573 K by evaporating a free surface in vacuum and by the method of effusion. BeO was prepared from repeatedly distilled basic Be acetate by precipitation with sulphuric acid and annealing in vacuum at 1,300-2,600 K. It had a BeO content of 99.93% and impurities of Mg, Ti, and Si which had been detected by spectrum analysis. The test samples were pressed in hot state and again annealed at 2,600 K. Vapor pressure was measured in an MVP-3M high-frequency furnace. Effusion measurements were made by means of tungsten containers according to Langmuir. Surface temperature was optically measured by means of an OPPIR-09 pyrometer. The substance evaporating out of the containers was collected in a water-cooled quartz collector. 4

Card 1/2

66179

Measurement of the Vapor Pressure Which Is in Equilibrium With Solid Beryllium Oxide SOV/20-128-5-33/67

As the BeO stuck too tightly to the quartz, the latter had to be coated with polystyrene or polyethylene which were washed out together with the BeO. After evaporation of the solvent, the content of BeO was colorimetrically determined with the help of the reagent "Berillon-11 IREA". Experimental results are listed in table 1. The equation $\lg P_{st} = 8.156 - 3.324/T \cdot 10^4$ and the heat of sublimation $\Delta H_0^o = 157.6$ kcal/Mol were determined by the method of least squares. Results are in good agreement with data given in publications. There are 1 table and 8 references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: June 5, 1959 by V. I. Spitsyn, Academician

SUBMITTED: June 2, 1959

Card 2/2

NESMEYANOV, A. N. (Dr.)

"Hot Atom Synthesis of Compounds Containing C^{14} and H^3."

report presented at the Symposium on the Chemical Effects of Nuclear Transformations, Prague, 24-27 Oct 60

NESMEYANOV (about 55-60 yrs old, brother of Pres. of Sov Acad. Sci.)
Prof., Moscow State Univ.

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R001136630(

NESMEYANOV, Andrey Nikolayevich

Soviet Moon Rockets; A report on the flight and scientific results of the second and third space rockets (Rev. Ed.) London, Soviet Booklets, 1960.
66 p. illus., diagrs., ports. (Soviet Booklet, No. 62)
Appendix: Some problems of the Future Exploration of the Moon with Rockets, by G.V. Petrovich.

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R00113663O(

68216

5.4210(A)

~~5(2), 5(4)~~

S/078/60/005/02/002/045
B004/B016

AUTHORS: Nesmeyanov, An. N., Iofa, B. Z., Polyakov, A. S.

TITLE: Pressure of Saturated Vapor of Solid Indium Antimonide

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol 5, Nr 2, pp 246-248 (USSR)

ABSTRACT: The measurement of this pressure was made by a modified method of Knudsen (Refs 7,8) by adding Sb^{124} and In^{114} at temperatures between 636 and 720°K. The two substances with active isotopes added were fused together in quartz capillaries. The radiograms taken by Yu. P. Simanov at the khimicheskiy fakul'tet MGU (Chemical Department of Moscow State University) confirm the occurrence of one single phase of InSb. The condensate obtained on determination of the vapor pressure was transformed into sulfides the activity of which was measured. The value of the vapor pressure of InSb determined by evaporation of radioactive In is by far higher than the value resulting from the determination of the evaporated Sb (Tables 1,2, and Fig). The values obtained by measuring the evaporated Sb are practically in agreement with the pressure of the saturated

Card 1/2

68216

S/078/60/005/02/002/045
B004/B016

Pressure of Saturated Vapor of Solid Indium Antimonide

vapor of pure metallic Sb (Ref 7) whereas the vapor pressure determined by In corresponds with that of solid InSb. Prior to evaporation, a partial dissociation of the compound occurs. The vapor pressure above the solid InSb equals the vapor pressure of the metallic Sb plus the vapor pressure of InSb. The vapor pressure of the metallic In is negligible at the temperatures applied. The authors point out that the determination of the vapor pressure with freshly prepared InSb gives increased values. By pulverization of the substance, a disturbance of the crystal lattice occurs, and a crystal surface with excess energy is formed, as it was likewise observed in As_2O_3 and $ZnAs_2$ (Ref 11). There are 1 figure, 2 tables, and 11 references, 8 of which are Soviet.

SUBMITTED: January 12, 1959

Card 2/2

84309

5.4700 2203, 1018, 1136 60

S/189/60/000/004/005/006
B002/B060

AUTHORS: Nesmeyanov, An. N., Khandamirova, N. E.

TITLE: The Relationship Between the Sublimation Heat of Elements and Their Position in the Periodic System

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya 2, khimiya, 1960, No. 4, pp. 28 - 32

TEXT: The present paper lists the standard sublimation heats $H^{o}_{298^{o}K}$ of chemical elements. The values were, for the most part, taken from Honig's paper (Ref. 4), and, in part, from Ref. 6. As may be seen from the diagram of Fig. 1, the sublimation heat likewise depends on the position in the periodic system. If instead of $H^{o}_{298^{o}K}$ the function $\frac{H^{o}_{298^{o}K}\cdot A}{r}$ is considered (r being the interatomic distance in the crystal lattice, and A the atomic weight), a linear dependence on the atomic weight within the groups (Fig. 2) is obtained. The groups Cu, Ag, Au, as well as Zn, Cd, Hg,

Card 1/2

84309

The Relationship Between the Sublimation Heat of Elements and Their Position in the Periodic System

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B002/B060

are exceptions to this rule. The above-mentioned linear dependence can be used to estimate hitherto undetermined sublimation heats (Fr, Ra, Tc, Ac, Sc, Y). Moreover, errors in the determination can be detected (Nb, Mn, La, Mo). A table gives a comparison between calculated and measured values. There are 2 figures, 1 table, and 6 references: 3 Soviet and 2 British.

ASSOCIATION: Kafedra radiokhimii (Chair of Radiochemistry)

SUBMITTED: April 7, 1959

Card 2/2

NESMEYANOV, An. N.; SAZONOV, L.A.

Measurement of the pressure of saturated cesium chloride vapor by means of radioactive tracers. Zhur. neorg. khim. 5 no.3:519-521 Mr '60. (MIRA 14:6)

(Cesium chloride)
(Vapor pressure)

S/076/60/034/04/23/042
B010/B009

AUTHORS: Nesmeyanov, An. N., Belykh, L. P. (Moscow)

TITLE: Measurement of the Saturated Vapor Pressure of Solid Lithium Oxide

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 4, pp. 841 - 844

TEXT: A new apparatus (Figs. 1 and 2) for measuring vapor pressure according to the integral Knudsen method has been designed. By means of this apparatus it is possible to carry out series of experiments without having to discontinue the vacuum in the effusion chamber. The apparatus is basically a brass attachment to the TsVL-100 diffusion pump. This attachment is divided into two parts by a vacuum valve. The effusion chamber is lifted into the heated area by means of a lifting mechanism without interruption of the vacuum. The apparatus is heated by a high-frequency current. By means of the apparatus described the evaporation rate and pressure of the saturated vapor of solid lithium oxide were determined at 1388-1506°K. The sublimation heats of lithium oxide (Table 2) were calculated from the measured values (Table 1) and the thermodynamic potentials calculated at the IGI AN SSSR (IGI AS USSR). The dependence $\log P_{at} = 7.4809 - 1.8397/T$ and

Card 1/2

Measurement of the Saturated Vapor Pressure of Solid Lithium Oxide

S/076/60/034/04/23/042
B010/B009

sublimation heat ΔH_o^o = 90.46 kcal/mole were obtained as results. The latter value agrees well with data given by A. M. Yevseyev and G. V. Pazharskaya. Values of the sublimation heat of lithium oxide according to the data given by other authors are listed in Table 3. There are 3 figures, 3 tables, and 7 references, 1 of which is Soviet.

Card 2/2

S/076/60/034/05/15/038
B010/B002

AUTHORS: Nesmeyanov, An. N., Firsova, L. P.

TITLE: Measurement of the Pressure of the Saturated Vapor of Boric Anhydride

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 5, pp. 1032-1035

TEXT: The vapor pressure of boric anhydride (B_2O_3) was measured by Knudsen's effusion method. Experiments were made in a system described in Ref. 9. The work was done in a vacuum of from 1.10^{-5} to 1.10^{-6} torr. A special control was made on dissociation, and it was found that a maximum of 3% of B_2O_3 dissociates to BO and O. The measured values for vapor pressure at 1299-1515°K are given in Table 1. The following equation was derived by the method of least squares: $\log p_{(torr)} = -16805/T + 9.44$. $\Delta H_0^0 = 89.32$ kcal/mole was calculated from the slope of the straight line of the pressure dependence on temperature.

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Card 1/2

Measurement of the Pressure of the Saturated Vapor of Boric Anhydride

S/076/60/034/05/15/038
B010/B002

The evaporation heats (Table 2) were calculated at $0^{o}K$ proceeding from the values of vapor pressure and the values of thermodynamic functions obtained from the IGI AN SSSR (IGI AS USSR). A comparison between the values obtained for the evaporation heat and various data contained in publications (Table 3) shows that the values obtained are in good agreement with effusion measurements (Refs. 2, 5, 6), but deviate strongly from measured values obtained by the dynamic method (Refs. 3, 7). There are 3 tables and 12 references: 1 Soviet, 7 American, 1 German, 1 Italian, and 1 Japanese.

√B

SUBMITTED: July 4, 1958

Card 2/2

NESMEYANOV, An.N.; FIRSOVA, L.P.; ISAKOVA, Ye.P. (Moscow)

Measurement of the saturated vapor pressure of lead oxide.
Zhur.fiz.khim. 34 no.6:1200-1204 Je '60.
(MIRA 13:7)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Lead oxide) (Vapor pressure)

NESMEYANOV, An. N.

81971

S/076/60/034/07/03/009
B015/B070

5.4210

AUTHORS: Nesmeyanov, An. N., Khandomirova, N. E., Vilenskiy, V. D., Birin, Ye. A., Borisov, Ye. A.

TITLE: Effect of Oxide Films on the Rate of Vaporization

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 7, pp. 1425-1429

TEXT: The effect of oxide films on the rate of vaporization of metallic zinc, cadmium, lead, and beryllium was investigated by the method of isotopic exchange (Ref. 7) and the integral variant of Knudsen's method (Ref. 8). For the isotopic exchange method Zn^{65}, Cd^{113}, and RaD were used as indicators. For the Knudsen's method a ФЭК-52 (FEK-52) colorimeter and the reagent "berillon II ИРЕА(IRYeA)" were used. The colorimetric determination of lead was carried out in the laboratoriya geokhimii geologicheskogo fakul'teta MGU (Laboratory of Geochemistry of the Department of Geology of MSU). The values obtained are given in Tables 1-3. The results of the experiments show that the method of isotopic exchange can be

Card 1/2

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used for the study of the mechanism of vaporization and the determination of the vaporization coefficients. A dependence of the rate of vaporization and Langmuir coefficient α on the degree of oxidation is found. The rate of vaporization depends on the mechanical treatment of the metal surface and the residual pressure in the instrument. At temperatures between 410 and 545°C solid solutions of lead oxides with varying composition Pb_xO_y are formed on the surface. The oxide films on the metal surface may lead either to a decrease (Zn, Cd, Be) or an increase (Pb) of the measured values of the vapor pressure. There are 3 tables and 14 references: 4 Soviet, 5 American, 2 German, 1 British, and 1 French.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: September 6, 1958

K

84244

15.2142 2209, 2308

S/076/60/034/009/002/022
B015/B056

AUTHORS: Nesmeyanov, An. N. and Firsova, L. P.

TITLE: Determination of Vapor Pressure in Equilibrium With Solid Silicon Dioxide

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 9, pp. 1907-1910

TEXT: The vapor pressure over solid silicon dioxide (α-tridimite) was measured within the temperature range of from 1601° to 1739°K according to the integral variant of the Knudsen effusion method on a previously described vacuum device (Refs. 1, 2). The evaporated substance was condensed on a water-cooled cap, was dissolved in NaOH, and the silicon was colorimetrically determined. From the result of the colorimetric analysis, the summational diffusion rate of all vapor components was calculated (Table 1, results). On the assumption that the vapor phase contains only SiO and O_2 molecules, the heat of formation of SiO_{gas} was calculated by using the values for the heat of formation of the components (made available by the IGI AN SSSR (IGI AS USSR) (Table 2). The values

Card 1/2

84244

Determination of Vapor Pressure in Equilibrium With Solid Silicon Dioxide S/076/60/034/009/002/022 B015/B056

obtained agree comparatively well with data given in publications, among others also with data given by P. Gel'd and M. Kochnev (Ref. 6). There are 2 tables and 9 references: 4 Soviet, 3 US, and 2 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: September 6, 1958

Card 2/2

86154

S/076/60/034/008/017/039/XX
B015/B063

5.4700 2203 1273

AUTHORS: Nesmeyanov, An. N., Firsova, L. P., and Isakova, Ye. P.

TITLE: Measurement of the Pressure of Saturated Vapor of Solid Lead Monoxide by the Method of Continuous Flow

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 8, pp. 1699 - 1701

TEXT: In two series of experiments described in Ref. 1, the authors determined the vapor pressure of PbO by evaporation from an open surface and out of an effusion chamber in vacuo. As the results of the two series did not agree with one another and with the data of Feiser, additional measurements have now been made by the method of continuous flow. The measurements were carried out between 1055° and $1153^{\circ}K$ with 99.5% PbO (massicot) and with oxygen, air, and nitrogen as carrier gases. The sample was put in a Pt boat which was placed into a quartz or porcelain tube lined with Pt sheet. The tube was then heated in a furnace. The temperature near the Pt boat was measured with a Pt - Pt/Rh thermocouple. The quantity of carrier gas passed through was measured with a Patrikeyev gasometer of

Card 1/4

(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: September 19, 1958

Card 2/2

86787

S/076/60/034/011/023/024
B004/B064

11.2221, also 2308, 2209, 1211

AUTHORS: Firsova, L. P. and An. N. Nesmeyanov

TITLE: Degree of Dissociation and Partial Vapor Pressures of Lithium, Beryllium, Boron, Silicon, and Lead Oxides

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 11, pp. 2615-2616

TEXT: In previous papers (Refs. 1,2) the authors have published the results of measurement of the pressure of LiO_2, BeO, SiO_2, and PbO vapors that were in equilibrium with the solid oxides. The determination was made by the Knudsen-Langmuir method. The thermal dissociation was not taken into account when evaluating the experimental data. The present paper interprets the data in consideration of the thermal dissociation. This is shown by the example of LiO_2. The equation

$LiO_2 \rightleftharpoons 2Li + \frac{1}{2}O$ is given as well as the degree of dissociation x,

Card 1/3

86787

S/076/60/034/011/023/024
B004/B064

Degree of Dissociation and Partial Vapor Pressures of Lithium, Beryllium, Boron, Silicon, and Lead Oxides

the dissociation constant K_p, the total number n of the moles of evaporated oxide, the surface s of the effusion opening and/or the surface of the sample and the time t of exposition, and the following is written down: $p_{Li} = 2.553 \cdot 10^{-2}(n/st)2x\sqrt{TM_{Li}}$. By inserting the corresponding expressions also for p_{Li_2O} and p_{O_2} into the equation

$K_p = p_{Li}^2 p_{O_2}^{1/2} / p_{Li_2O}$ the following is obtained:

$$K_p^2 = \left\{x^5 n^3 T^{3/2} / \left[(1 - x)^2 (st)^3\right]\right\} \cdot (2.2553 \cdot 10^{-2})^3 (M_{Li}^2 M_{O_2}^{1/2} / M_{Li_2O}) \quad (1).$$

Similar equations are derived for the other oxides. For temperatures between 1000 and 2500°K, the degrees of dissociation are so low, except for SiO_2, that the results do hardly differ from those given in Refs. 1,2. For SiO_2, 90% of which dissociate, the data hold on the assumption that

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B004/B064

Degree of Dissociation and Partial Vapor Pressures of Lithium, Beryllium, Boron, Silicon, and Lead Oxides

only dissociation products evaporate. There are 1 table and 2 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: January 23, 1960

Card 3/3

S/076/60/034/012/009/027
B020/B067

5.4100 (1043,1087)

AUTHORS: Firsova, L. P. and Nesmeyanov, An. N.

TITLE: Determination of the Condensation Coefficients of Lithium-, Beryllium-, Boron-, Silicon-, and Lead Oxides

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 12, pp. 2719-2722

TEXT: The condensation coefficients of beryllium- and lead oxide were determined by comparing the measured evaporation rates on the free surface in vacuo with the data on vapor pressure which is in equilibrium with the oxides concerned, and by means of the Knudsen methods (Table 1). To determine the condensation coefficient of lithium-, boron-, and silicon oxide, the vapor pressure of these compounds was measured by the Knudsen method, i.e., by using effusion outlets with different cross sections and drags (Table 2). The authors also studied the time dependence of the measured vapor pressures of these compounds (Fig. 1). Since the results of the effusion measurements and the data obtained according to Langmuir were identical within the limits of measuring errors (Table 1) it can be

Card 1/3

88256

Determination of the Condensation Coefficients of Lithium-, Beryllium-, Boron-, Silicon-, and Lead Oxides

S/076/60/034/012/009/027
B020/B067

assumed that the condensation coefficients of beryllium and lead oxide are almost unity. The best method of determining the condensation coefficients is the direct measurement of the surface temperature of the material evaporated. Therefore, either the surface temperature must be measured directly or a correction has to be made by taking account of the fact that the temperature difference between mass and material surface depends on the diameter of the effusion outlet. The authors used both methods of temperature measurement. The results of measurements with different effusion outlets were evaluated by the following equation:

$$\alpha = (p'A' - p''A'')/[S(p'' - p')] \qquad (1)$$

where p' and p'' denote the apparent pressures when using effusion outlets of a diameter of A' and A''; S denotes the cross section of the Knudsen chamber. The results of calculations are given in Table 2. Experiments of determining the dependence of p_{Kn} on t_i also permitted a qualitative estimation of the condensation coefficients. The experimental results indicate that the condensation coefficients of all oxides studied, with the exception of SiO_2, are almost unity. The deviation is so small that it

Card 2/3

Determination of the Condensation Coefficients of Lithium-, Beryllium-, Boron-, Silicon-, and Lead Oxides

S/076/60/034/012/009/027
B020/B067

may be neglected when calculating the vapor pressure. No definite conclusion has as yet been drawn concerning the condensation coefficient of silicon dioxide because determinations have been made only by one method with low measuring accuracy. There are 1 figure, 2 tables, and 12 references: 5 Soviet, 6 US, and 1 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: March 13, 1959

X

PHASE I BOOK EXPLOITATION SOV/5950

Nesmeyanov, An. N., Doctor of Chemical Sciences, ed.

Prakticheskoye rukovodstvo po radiokhimii. Dopolnitel'nyy tom (Practical Handbook on Radiochemistry. Supplementary Volume) Moscow, Goskhimizdat, 1961. 322 p. Errata slip inserted. 10,000 copies printed.

Sponsoring Agency: Avtorskiy kollektiv sotrudnikov kafedry radio-khimii khimicheskogo fakul'teta Moskovskogo gosudartvennogo universiteta imeni M. V. Lomonosova.

Ed.: E. E. Finkel'; Tech. Ed.: V. V. Kogan.

PURPOSE: This book is intended for scientific workers and engineers who have not previously worked with radiosotopes, as well as for advanced chemistry students at schools of higher technical education.

COVERAGE: The original work was written as a handbook for use in practical work and scientific investigations in radiochemistry

Card 1/3

SOV/5950

Practical Handbook on (Cont.)

and related fields. The present supplement was necessitated by the great number of new radioactive radiation recording instruments introduced since then into the laboratory, where they are now used to perform many of the operations described in the basic work. The supplement includes descriptions of the most widely used Soviet radioactive radiation recording equipment, practical problems in microradiography, and practical and computational exercises for self-study. The computation problems in Ch. IV reflect the various divisions of radiochemistry as these are described in the basic work, and require the use of the theoretical material and reference graphs and tables given there for their solution. Both the computation problems and the practical exercises require the use of the book Polucheniye radioaktivnykh izotopov (Radioisotope Production), by An. N. Nesmeyanov, A. V. Lapitskiy, and N. P. Rudenko. Authorship of various chapters of the present work is given as follows: Ch. I -- I. V. Golubtsov; Ch. II -- K. B. Zaborenko and V. I. Korobkov; Ch. III -- B. Z. Iofa; Ch. IV -- K. B. Zaborenko, B. Z. Iofa, V. I. Korobkov, A. V. Lapitskiy, V. B. Lukyanov, An. N. Neseyanov, N. P. Rudenko, V. M. Fedoseyev, E. S. Filatov,

Card 2/3

Practical Handbook on (Cont.) SOV/5950

and L. P. Firsova. References are given following the individual chapters.

TABLE OF CONTENTS:

Card 3/[redacted] 3

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R001136630(

S/081/62/000/008/023/057
B160/B101

AUTHORS: Belykh, A. N., Nesmeyanov, An. A.

TITLE: Determining the vapor pressure of lithium, boron, silicon and lead oxides

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 8, 1962, 148, abstract 8Ye11 (Sb. "Fiz.-khim., osnovy proiz-va stali." M., AN SSSR, 1961, 342 - 346)

TEXT: A method and instrument for determining the vapor pressure of the oxides of certain elements are described. The well-known methods of Knudsen and Langmuir are the basis of the experiments. The distinguishing feature of the method is that it is possible to carry out all the operations without breaking the vacuum. The pressures of vapor in equilibrium with condensed oxides over a wide range of temperatures are measured. The partial pressures of the vapor components, the thermodynamic values of the heat of evaporation, the reaction heats, etc. are calculated. The condensation coefficient of the oxides studied is shown to be close to unity. [Abstracter's note: Complete translation.]
Card 1/1

S/186/61/003/005/014/022
E160/E185

AUTHORS: Nesmeyanov, An.N., and Filatov, E.S.

TITLE: The phase and isotope effects in the secondary reactions of bromine recoil atoms in the bromo-derivatives of methane

PERIODICAL: Radiokhimiya, v.3, no.5, 1961, 601-609

TEXT: The behaviour of CCl_3Br, CCl_2Br_2, $CHBr_3$, $CHFBr_2$, CH_2BrNO_2 and CBr_3NO_2 after bombardment with neutrons was investigated in order to verify the conflicting views of F.S. Rowland and W.F. Libby (Ref.4: J. Chem. Phys., v.21, 9, 1495 (1953)) that the isotope effect can be observed in solids only, and those of J. Willard (Ref.5: Ann. Rev. Nucl. Sci., v.3, 193 (1953)) that the effect may be observed in liquids. The experimental technique followed was the same as that described previously (An.N. Nesmeyanov, Ye.A. Borisov, I. Zvara, Ref.2: Radiokhimiya, v.1, 3, 325 (1959)). In the case of CCl_2Br_2, $CHBr_3$ and $CHFBr_2$, the dependence of the retention and the yield of

Card 1/4

S/186/61/003/005/014/022
E160/E185

The phase and isotope effects in ...

individual products on the concentration of free bromine added before the irradiation was studied. The effect of the temperature changes during irradiation on the secondary reactions following (n, γ)-reaction in CCl_2Br_2 was also investigated. It was found that after irradiation the retention of bromine in the solid CCl_3Br, CCl_2Br_2, $CHBr_3$, $CHFBr_2$ and CBr_3F is much greater than in the compounds in liquid state. There exists a linear relationship between retention and concentration of bromine in solid CCl_2Br_2 and $CHBr_3$, which suggests that only high energy reactions between the recoil atoms and the medium take place. Libby's supposition about the appearance of isotope effects in solids could not be confirmed for the compounds examined. Willard's views on the possible existence of the isotope effect in liquids were confirmed, but it follows from his supposition that retention should be greater for Br^{80m} than for Br^{82}. The results show the opposite to be true. The absence of the isotope effect in solids could probably be explained in terms of an increase in the rate of neutralisation of the charge on the recoil atoms of bromine with the rise in the bond strength between molecules in the molecular

Card 2/4

S/186/61/003/005/014/022
The phase and isotope effects in ... E160/E185

crystal. The isotope effect is observed only in compounds of the $CH_nX_mBr_{4-(n+m)}$ type, where X is Cl, F or I. When X is NO_2 the isotope effect is not observed in either liquid or solid phases. The non-polar compounds (CCl_3Br, CCl_2Br_2, CBr_3F) in liquid state show the greatest isotope effect. The effect was absent as a rule in the polar compounds ($CHBr_3$, CBr_3NO_2, CH_2Br_2). However, the presence of another halogen in a bromomethane appears to be a more common factor leading to isotope effects. There are 9 figures, 2 tables and 18 references: 3 Soviet-bloc and 15 non-Soviet-bloc. The four most recent English language references read as follows:

Ref. 9: E. McCauley, R.H. Schuler. J. Phys. Chem., v.62, 11, 1364 (1958).

Ref.10: B. Suryanaravana, A.P. Wolf. J. Phys. Chem., v.62, 11, 1369 (1958).

Ref.13: G. Harbottle. J. Am. Chem. Soc., v.82, 4, 805 (1960).

Card 3/4

The phase and isotope effects in ... S/186/61/003/005/014/022
E160/E185

Ref. 16: M. Milman,
J. Am. Chem. Soc., v.80, 21, 5592 (1958)

SUBMITTED: November 22, 1960

Card 4/4

31892

S/186/61/003/005/015/022
E160/E185

5.4600

AUTHORS: Nesmeyanov, An.N., Filatov, E.S., and Mansfel'd, A.

TITLE: Chemical action of the Br^{82} recoil atoms after (n, γ)- reaction on some derivatives of benzene

PERIODICAL: Radiokhimiya, v.3, no.5, 1961, 610-613

TEXT: In order to get a more detailed knowledge of the influence of the mass of colliding particles on the chemical reactions of recoil atoms, the substitution of Br^{82} recoil atoms, obtained in the reaction $Br^{81}(n,\gamma)Br^{82}$, with atoms or atom groups in benzene derivatives, was investigated. Mixtures of C_2H_5Br with C_6H_5Cl, C_6H_5I, $C_6H_5CH_3$ and $C_6H_5C_2H_5$ were irradiated with neutrons. The yields and activity retentions were recorded (see Table 1). It has been shown that the substitution of the monoatomic benzene derivatives by the Br^{82} recoil atom is in direct relationship with the mass ratio. Good agreement between the calculated (from $R_X = \alpha(E_2/E_1^0)$, derived on the assumption that elastic collisions of the Br - X type lead to C_6H_5Br

X

Card 1/

31892

Chemical action of the Br^{82} recoil ... S/186/61/003/005/015/022
E160/E185

formation, where E_1^0 - energy of recoil atom before collision, E_2 - energy given to X, α - constant) and experimental yields, confirms the assumption that elastic collision mechanism operates in the formation of C_6H_5Br from halogen substituted benzenes. In the absence of complete experimental data on C_6H_5Br formation from alkyl benzenes, the reaction mechanism cannot be determined at present.

There are 1 figure, 2 tables and 5 references: 3 Soviet-bloc and 2 non-Soviet-bloc. The English language references read as follows:

Ref.4: J.M. Miller, R.W. Dodson.
J. Chem. Phys., v.18, 6, 865 (1950).
Ref.5: J. Willard.
Symposium on the Chem. Effects of the Nuclear Transformation. Prague (1960).

SUBMITTED: April 20, 1961

Card 2/3

X

31893
S/186/61/003/005/016/022
E160/E385

5.4600

AUTHORS: Nesmeyanov, An.N. and Filatov, E.S.

TITLE: Chemical action on benzene of the Br^{82} and Hg^{203} recoil atoms produced by the $Br^{81}(n,\gamma)Br^{82}$ and $Hg^{202}(n,\gamma)Hg^{203}$ reactions

PERIODICAL: Radiokhimiya, v.3., no.5, 1961, 614 - 622

TEXT: In order to explain the mechanism of substitution of hydrogen by heavy recoil atoms the authors investigated the dependence on the quantitative composition of the mixture of the yields of various products, containing Br^{82}, obtained by neutron irradiation, from a Po-Be source, of solutions of C_2H_5Br in C_6H_6 and the yields of phenyl mercury bromide and bromobenzene obtained by neutron irradiation in a nuclear reactor of solutions of $HgBr_2$ in benzene. Solutions of C_2H_5Br in benzene, with concentrations varying from 1 to 100 mol.% were irradiated for 4-5 days with a neutron flux of $8x10^6$ neutrons/sec, then the quantity of radioactive bromine in the

Card 1/4

31893
S/186/61/003/005/016/022
E160/E385

Chemical action on ....

form of atoms, ions and various organic compounds was determined. The yields of products containing radioactive atoms of Br^{82}, obtained by irradiation of the system $C_2H_5-C_6H_6$, are given in Table 1 (1 - concentration of bromoethane in mol.%; 2 - yield, in %; 3 - total retention; 4 - polymers). Solutions of $HgBr_2$ in benzene, sealed in quartz ampules, were irradiated for 10 and 5 minutes, using a flux of 4×10^{12} neutrons/sec.cm^2. The analysis was carried out seven and thirty days after irradiation. Thus, the short-life isotopes Hg^{205} and Hg^{199} had time to decay and only Hg^{203} and Br^{82} remained (the activity of Hg^{197} was negligible). The yields of products containing radioactive Hg^{203} and Br^{82} caused by the (n,γ) reaction during irradiation of solutions of $HgBr_2$ in benzene are entered in Table 2 (I - analysis after 7 days, irradiation time 10 minutes; II, III - analysis after 30 days, irradiation time 5 minutes). The relationship between

Card 2/64

32893
S/186/61/003/005/016/022
E160/E385

Chemical action on ....

retention and quantitative composition of the mixture $C_2H_5Br-C_6H_6$ was investigated. For concentrations of C_2H_5Br in the 1.0 - 0.2 M range the retention changed only a little with dilution. In the 0.2 - 0.02 M range there was a sudden fall in the C_2H_5Br yield, which is attributed to a slow-down of the Br^{82} recoil atoms in benzene in the case of higher degrees of dilution. The yield of bromobenzene rises linearly with concentration in the 1.0 - 0.2 M C_2H_5Br range and remains almost constant in the 0.2 - 0 M range; the yield of $C_2H_4Br_2$ varies only little. Comparison of the relationship yield of bromobenzene concentration in the mixture $C_2H_5Br-C_6H_6$ with that of chlorobenzene in the mixture $CCl_4-C_6H_6$, published by J.M. Miller and R.W. Dodson (Ref. 9: J. Chem.Phys., 18, 6, 365, 1950) shows that the difference between the masses of Cl^{38} and Br^{82} accounts for the unequal energy transfer of the

Card 3/4

31893
S/186/61/003/005/016/022
E160/E385

Chemical action on ....

benzene molecules during inelastic collisions of the recoil atoms. The yield of hydrogen substitution products is nearly proportional to the mass ratios of the recoil atoms (m) and that of the benzene molecule (M), namely: $M/(m + M)$.
There are 2 figures, 3 tables and 13 references: 8 Soviet-bloc and 5 non-Soviet-bloc. The four English-language references mentioned are: Ref. 6: Harris - Symposium on the Chem.Effects of the Nucl. Trans., Prague, 1960; Ref. 8: W.F. Libbi - J. Am.Chem.Soc., 69, 10, 2523, 1947; Ref. 9: J.M.Miller, R.W. Dodson (in text); Ref. 11: K.E. Siekierska, A.Sokolowska, I. Campbell - J. Inorg. Nucl.Chem., 12, 2, 18, 1960.

SUBMITTED: April 20, 1961

Card 4/4

NESMEYANOV, Andrey Nikolayevich (Moscow)

Ways of science. Magy tud 68 no.4:211-220 Ap '61. (EEAI 10:6)

1. A Szovjetunio Tudomanyos Akademijanak Elnoke, Moscow.
(Science)

S/020/61/140/001/020/024
B127/B101

AUTHORS: Genov, L. Kh., Nesmeyanov, An. N., and Priselkov, Yu. A.

TITLE: Measurement of thallium vapor pressure with radioactive indicators

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 1, 1961, 159 - 161

TEXT: The authors measured the vapor pressure of liquid and solid thallium in wide temperature intervals since the results published so far were conflicting. The authors used the methods of Knudsen and Langmuir with introduction of the radioactive isotope Tl^{204} and a special device described by them in Ref. 7: Yu. A. Priselkov, A. V. Tseplyayeva, K. I. Smirnov, Pribor dlya izmereniya davleniya nasyshchennogo para metodom effuzii (Apparatus for measuring the saturated vapor pressure by the effusion method), Izd. fil. VINITI, tema 39, No. П-58-95/6, 1958. The temperatures in the device were measured with a Cr-Al thermocouple connected to a ПМС-48 (PMS-48) potentiometer. The error in temperature measurement due to heat loss was neglected. The specific activity of the thallium used was 2mcu/g, which did not influence the results. Tl^{204}

Card 1/4

contained no radioactive impurities. The rate of evaporation was determined from the radioactivity of the condensed vapor leached out with nitric acid. The solution was neutralized with ammonia, heated up to 60 - 70°C, and quantitatively precipitated with $K_2Cr_2O_7$ as thallium chromate. The radioactivity of the dried filtrate was measured with an end-window counter. The vapor pressure P was determined from the equation $\log P = 17.14\, G\sqrt{T/M}$ (1), where M is the molecular weight of vapor, and G is the effusion rate as determined from the equation: $G = g/\tau K\sigma$, where g is the quantity of evaporated substance; τ is the exposure; σ is the surface of the effusion orifice; and K is Clausing's factor. The results given in Table 1 were obtained from experiments (1-19) with different effusion orifices and by the method of evaporation with a free surface (experiments 20-29). The results agree with the equation $\log P = 8.0871 - 8899.4/T$ obtained by the method of least squares. It is assumed that the condensation coefficient of liquid and solid thallium is close to unity. This factor depends on the state of the gaseous phase, on the energy state of the surface, and on the presence of an oxide film on this surface. On the other hand, it is shown indirectly that thallium vapor